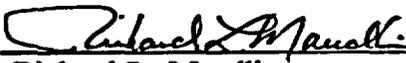


OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION  
QUALITY ASSURANCE SURVEILLANCE REPORT OF  
PACIFIC NORTHWEST LABORATORIES  
STATUS OF GLOBAL CLIMATE MODELING  
SURVEILLANCE YMP-SR-93-042  
CONDUCTED AT RICHLAND, WASHINGTON  
SEPTEMBER 21 THROUGH 22, 1993

ACTIVITIES SURVEILLED:

STATUS OF GLOBAL CLIMATE MODELING ACTIVITIES RELATED  
TO THE OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
CORRECTIVE ACTION REQUEST YM-93-024

Prepared by:  Date: 09-29-93  
Richard L. Maudlin  
Surveillance Team Leader  
Yucca Mountain Quality Assurance Division

Approved by:  Date: 10/5/93  
Donald G. Horton  
Director  
Office of Quality Assurance

## **1.0 EXECUTIVE SUMMARY**

This surveillance of Pacific Northwest Laboratories (PNL) activities related to Global Climate Modeling was conducted at Richland, Washington on September 21 and 22, 1993, as a follow-up to Corrective Action Request (CAR) YM-93-024, and to evaluate the status of activities related to the U.S. Department of Energy (DOE) Transition Plan for Future Regional Climate and Environment. During the surveillance, actions related to resolving the conditions identified in the CAR were evaluated along with implementation of the DOE Transition Plan. The results of the surveillance identified one condition adverse to quality which related to the lack of documentation required during the review process for software life cycle products. The condition was resolved prior to issuance of this report. Due to a change in approach which deviates from their response of July 30, 1993, PNL has not made sufficient progress at this time to resolve the conditions noted in CAR YM-93-024. Two recommendations were made and are documented in Section 6.0 of this report.

## **2.0 PURPOSE AND SCOPE**

Surveillance 93-042 was conducted at PNL's facility in Richland, Washington to determine the status of ongoing activities relating the resolution of the conditions noted in CAR YM-93-024, and those actions which are the responsibility of PNL in the DOE Transition Plan for Future Regional Climate and Environment.

## **3.0 SURVEILLANCE TEAM**

Richard L. Maudlin, Surveillance Team Leader, Yucca Mountain Quality Assurance Division/Quality Assurance Technical Support Services (YMQAD/QATSS)

Jim Voigt, Observer, Quality Assurance, Sandia National Laboratories (SNL)

## **4.0 PERSONNEL CONTACTED DURING THE SURVEILLANCE**

P. Eslinger, Program Manager, PNL

V. Lauhala, Quality Engineer, PNL

L. Vail, Senior Resident Engineer/Lead Developer, PNL

W. Walters, Global Climate Task Manager, PNL

## **5.0 SURVEILLANCE RESULTS**

During the surveillance, discussions were held with the PNL Program Manager regarding the status of activities related to the implementation of corrective actions noted in CAR YM-93-024. Since PNL's revised response of July 30, 1993 to CAR YM-93-024, a change in approach to the resolution of the open items from the 1990

audit of the University of Maine has occurred. PNL Project Management has elected to redevelop the entire Ice Sheet Reconstruction Model (ISRM) from the beginning. This decision was based on the initial review of the code and associated documentation which was received from the University of Maine. The ISRM model will be developed from the beginning using PNL's Software Control Procedures for the development of new software. The original code received from the University of Maine has been placed under PNL's Configuration Management Program and is identified as "MAP 5", Version 1.00. The new code under development by PNL, which will replace MAP 5, has been placed under the PNL Configuration Management Program and is identified as "ISRM", Version 1.00. The other two items noted in CAR YM-93-024 related to the testing of the model and adequacy of the user documentation, remains unresolved. As of the date of this surveillance, a draft Validation and Verification Plan has been prepared. No test plans or user documentation have been prepared; subsequently, CAR YM-93-024 will remain open until all actions regarding the development of the ISRM have been completed. Also, PNL will be required to submit an amended response to their July 30, 1993 response due to the change in approach on resolving the items in CAR YM-93-024.

As part of the surveillance, a sampling of completed software products (i.e. Software requirements Specification [SRS] and Software Development Plan [SDP]) for the development of ISRM, Version 1.00, were selected to verify compliance with the requirements of: PNL-YMPO-SCP 1 titled, "Software Development Planning," Revision 1; PNL-YMPO-SCP 2 titled, "Software Reviews, Verifications, and Validation," Revision 1; and PNL-YMPO-SCP 8 titled, "Checklists," Revision 1. The results of this evaluation disclosed that PNL, in general, is complying with their approved Quality Assurance procedures with one exception. During the course of the surveillance, it was noted that no objective evidence exists to reflect that a Verification Staff Qualification Record had been completed for the reviewers assigned to review the SRS and SDP as required by PNL-YMPO-SCP 2. Also, it was noted that the Configuration Management Coordinator was not part of the review team assigned to review and comment on the SRS, as required by PNL-YMPO-SCP 2. This condition was resolved by PNL through generation of the Verification Staff Qualification Records for the reviewers of the SRS and SDP and documented evidence to reflect that the Configuration Management Coordinator had reviewed the SRS. An indepth review of the SRS and SDP was performed to determine that all of the requirements for format and content, as required by PNL-YMPO-SCP 1, had been fulfilled. The results indicated that compliance was satisfactory; however, the level of detail was not in all cases sufficient. Even though this is not a deviation of any documented requirement, it does reflect a need for management attention which will assure that the documentation can stand on its own without recourse to the originator.

The status of the PNL effort related to the schedules and deliverables as referenced in the DOE Transition Plan was evaluated. PNL, as of the date of this surveillance, has stated that the schedules and deliverables referenced in the DOE Transition Plan cannot be satisfied at this time. To date, the following is a status on the products generated, or that will be generated, as a result of the development of the ISRM:

1. Approved SRS, Completed
2. Approved SDP, Completed
3. Approved Software Design Document (Outline Only-No Approval)
4. Coding (Prototyping Only)
5. Approved Validation and Verification Plan (Draft-No Approval)
6. Approved Test Plans (Not Started)
7. Approved User Documentation (Not Started)

The code, when completed, will contain approximately 1,500 lines of code. PNL has projected a completion date of March 1994 for qualification of the completed software product.

Prior to transition of the Global Climate Modeling task from PNL to SNL, YMQAD should assess the need to perform a physical verification of the work completed to date by PNL regarding resolution of the open items from the 1990 University of Maine audit and CAR YM-93-024.

## 6.0 RECOMMENDATIONS

1. PNL should assure that a sufficient level of detail is documented in the software life cycle products to the point where the documentation will be self supporting. Personnel performing reviews should not be involved or have previous knowledge of the product or its content.
2. PNL should continue to perform monthly surveillances of the software development, testing, and qualification activities. Copies of these surveillance reports should be sent to YMQAD.

## 7.0 ATTACHMENTS

None